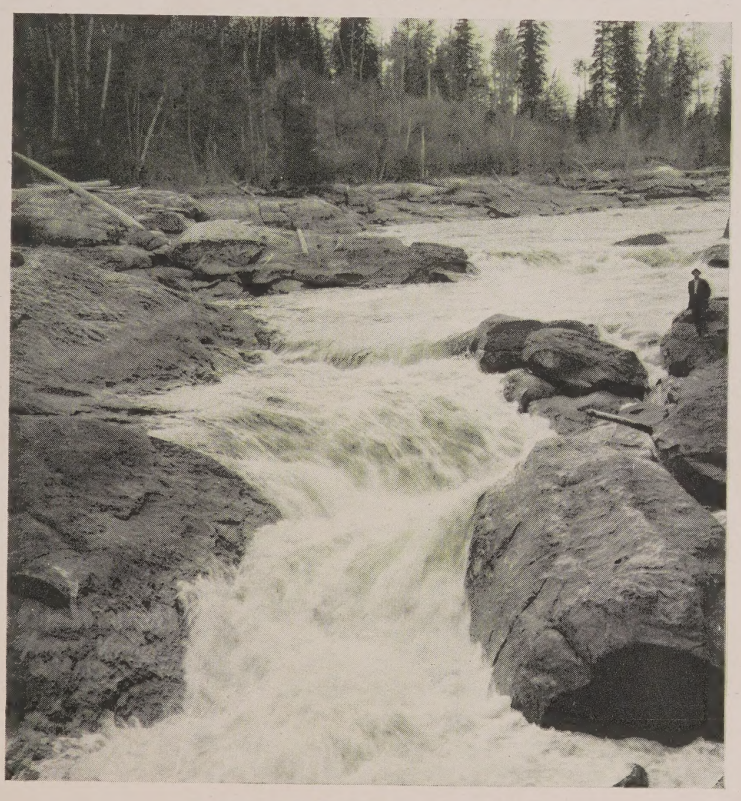
Vol. V. No. 2

The Bulletin

Hydro-Electric Power Commission of Ontario

FEBRUARY, 1919



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THE BULLETIN

PUBLISHED MONTHLY BY THE

Hydro-Electric Power Commission of Ontario

ADMINISTRATION BUILDING
190 UNIVERSITY AVE.
TORONTO

SUBSCRIPTION PRICE:
ONE DOLLAR PER YEAR

CONTENTS

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Editorial

Sales Development

IN the near future we intend beginning the publication of a series of articles on Sales Development, the first dealing with the value of the location of the shop. It is to be followed by subsequent articles treating on the value of a display window, the general arrangement of the interior of a store, the arrangement of stock, the use of silent salesmen, the class of goods to be displayed on top of the counter, advantageous use of display cards, proper shop lighting, the value of stuffer advertising, newspaper advertising, special sales and campaigns, the value of demonstrating appliances, the importance of classified sales records, etc.

We also intend to bring to your attention each month, in this section, dealers' helps, offered by the various manufacturers, with illustrations wherever possible, and probably a small amount of space in this section will be devoted to the printing of a record of the appliances approved by the Hydro Laboratory.

We are anxious to make THE BULLETIN just as useful as possible to our readers. In order to derive the fullest amount of use from your paper, it should be made to solve your personal business problems. This cannot be done except in a very general way, unless you bring your problems to our attention and ask our assistance. Whenever you come across something of this nature in your business, we suggest that you bring it to our attention.

We shall also be very glad indeed to hear from municipal managers with a view to suggesting all possible questions which they would like dealt with in the columns of THE BULLETIN.

We hope to be favored with our readers' usual hearty co-operation.

Death Calls Col. McNaught

Colonel William Kirkpatrick McNaught, C.M.G., member of the Hydro-Electric Power Commission of Ontario and President of the American Watch Case Company, died suddenly at his home in Toronto, on Sunday morning, February 2d.

On January 29th he had made a business trip to New York and while away suffered an attack of bronchitis. He went to bed on his return, and, under his physician's care was thought to be doing well, although he complained of feeling tired. However, about 9 o'clock he passed away peacefully.

The colonel was in his seventy-fourth year. He rendered distinguished service to his community and province. Colonel McNaught was born in Fergus and secured his early education in Brantford, although he lived the greater part of his life in Toronto. He commenced his business career with Robert Wilkes & Co., wholesale jewelers of Toronto, became foreign buyer for the company and later manager of the New York Office. In 1877 he organized the wholesale jewelry business of Zimmerman, McNaught and Lowe, selling out his interest in that firm in 1885 to organize the American Watch Case Company, of which he had been president and general manager since 1904.

Although his business interests created heavy demands upon his time, Colonel McNaught was able to devote himself to various public affairs. In his early years he was vice-president of the Toronto Rowing Club and president of the National Amateur Lacrosse Association. From 1901 to 1905 he was president of the Canadian National Exhibition, in the reorganization of which he took a very important part. From 1896 to 1898 he was president of the Canadian Manufacturers' Association, and in 1905 helped to organize the visit to Europe of three hundred Canadian manufacturers. He was chairman of the Canadian Tariff Commission from 1899 to 1905. In 1906 he was appointed a member of the Hydro-Electric Power Commission of Ontario, which post he held at the time of his death.

Colonel McNaught entered the Legislature in 1906 as a Conservative member for North Toronto and was re-elected by large majorities in 1908 and 1911. He retired just before the general election of 1914. During his service in the Legislature he was responsible for a number of important measures, among them the "Pure Milk Bill" and the measure fixing standard weights for loaves of bread. He was also a strong supporter of advanced temperance legislation.

Colonel McNaught was deeply interested in military matters. When a young man, he served in the Queen's Own Rifles and later was an officer in the 12th York Rangers. He was a first-rate shot and won many prizes for rifle and revolver shooting. With other officers of the 12th he volunteered for the relief of General Gordon at Khartoum, but the offer was not accepted by the British Government. At the outbreak of the European war he offered his services to the Canadian Government, and in November was attached to the headquarters staff at Ottawa, with the rank of honorary colonel. He gave splendid service as a member of the Special Land Transport Committee, which standardized and purchased transport for the C.E.F. Mr. McNaught, at the request of the Minister of Militia, raised $100,000 for a battery of armored cars and later assisted in the organization of the Eaton Machine Gun Battery. He also had much to do with the recruiting of the 84th and 169th Battalions by the 109th Regiment, of which he was honorary colonel.

The Colonel was a writer as well as being a keen business and public figure. He founded and for 26 years edited *Trader and Canadian Jeweller*, the pioneer trade journal of Canada. He also wrote a number of books and pamphlets dealing with the tariff, Ontario's electrical policy, Imperial federation and other matters including a book on lacrosse, which ran into two editions.

He is survived by a widow, who was formerly Miss Caroline Lugsdin, three sons, Dr. Harvard Y. McNaught of San Francisco, Charles B. McNaught of the insurance firm of Reed, Shaw & McNaught and W. C. McNaught of Toronto, and one daughter, Mrs. H. R. Tudhope of Toronto.

Technical Section

Chesley Municipal Pumping Plant

IN May, 1917, Hydro power replaced compressed air, oil and producer gas for domestic pumping. Up to that time all pumping was done by a 60 horsepower oil engine and a 60–70 horsepower producer gas engine connected through clutches to a main shaft from which was belted a 12 inch by 10 inch triplex pump and a 10 inch by 12 inch air compressor.

Water is obtained from two 8 inch wells each about 600 feet deep. Well No. 1 is located in the center of a concrete collecting basin about 35 feet in diameter. Well No. 2 is located about 150 feet from well No. 1. Both wells were operated by compressed air, the discharge from well No. 2 flowing by gravity to the collecting basin from which the water was pumped by the belt driven triplex pump to the mains and to a 60,000-gallon elevated tank about ⅜ of a mile from the pump house. The population of Chesley is under 2,000 and the daily consumption about 90,000 gallons which includes the supply to several manufacturing companies.

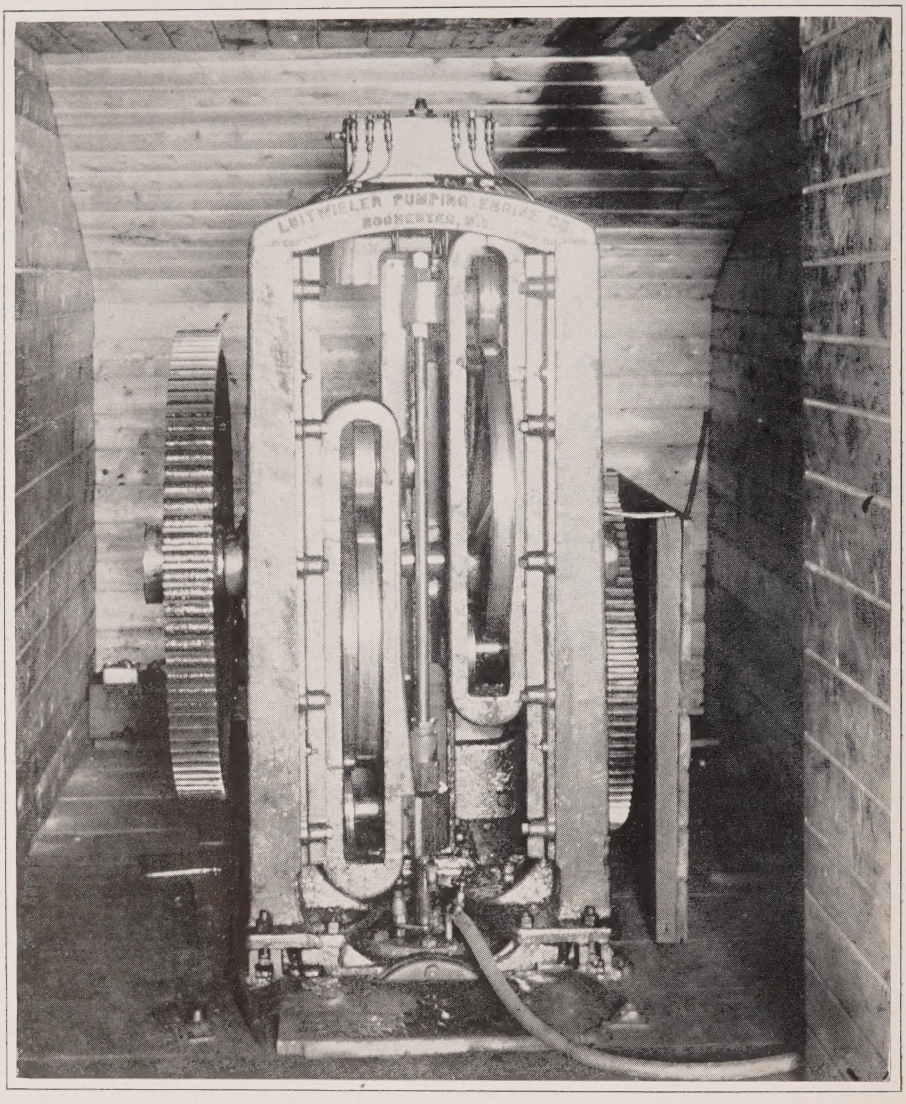
The motor-operated pump was placed directly over well No. 1. The pump head is shown in the illustration. The motor is directly behind the pump head. This unit is a 50 R.P.M. vertical double-acting deep well pump (with extended motor base) connected through a gear and raw-hide pinion to a 10 horsepower 60-cycle, 3 phase, 220-volt, 900 r.p.m., motor controlled by an automatic pressure type starter arranged to start the motor when the water pressure falls to 57 pounds and to stop the motor when the pressure is 65 pounds, *i.e.* when the elevated tank is full. The pump has a capacity of 108 Imperial gallons per minute against a total head of 220 feet, of which 60 feet is the distance between the water level in the well and the pump head, and 160 feet the additional head, including friction, to elevate the water to the top of the tank. It operates about 18 hours per day.

Oil is supplied to the working parts by a mechanical oiling device operated by the pump.

The local superintendent's duties comprise daily inspection and keeping the unit off the line during the municipality's peak load period.

The cost of pumping per 1,000 Imperial gallons in 1918 was 2.6 cents. This figure includes:—

1. Interest at 6 per cent and depreciation at 7½ per cent on the



Pump Head, Chesley Municipal Pumping Plant

investment which includes the cost of the pumping unit, piping and valves to connect it to the system, cost of installing and cost of addition to the structure over the reservoir to properly protect this pumping unit.

2. Cost of electric power, Class "B" 24-hour restricted power is used so that the pump may be used at any time of the day, except during peak load.

3. Allowance of superintendent's salary apportioned for daily inspec-

tion of the pump and making repairs when required.

4. Maintenance covering replacement of worn parts, packing, oil, etc.

The actual cost of pumping in 1916 covering fuel oil, coal and labor was $1,553.

The actual cost of pumping in 1918 covering electric power and labor was $795, showing a saving over the year 1916 of $758, or almost 50 per cent. Based on the wage rate of 1916, and normal operating conditions, this saving over the year 1916 would have been about $1,100, or 70 per cent.

It is a reasonable assumption that the costs of fuel oil and coal in 1916 will approximate the costs of these commodities during the next four years. Then based on this town's actual figures of the money saved in 1918 over 1916 this amount, $758, invested in a sinking fund at 5½ per cent. would amount to more than the capital expenditures on the electric pumping unit installed in 4 years or in other words the saving in using Hydro will pay for the electric pumping unit in less than 4 years.

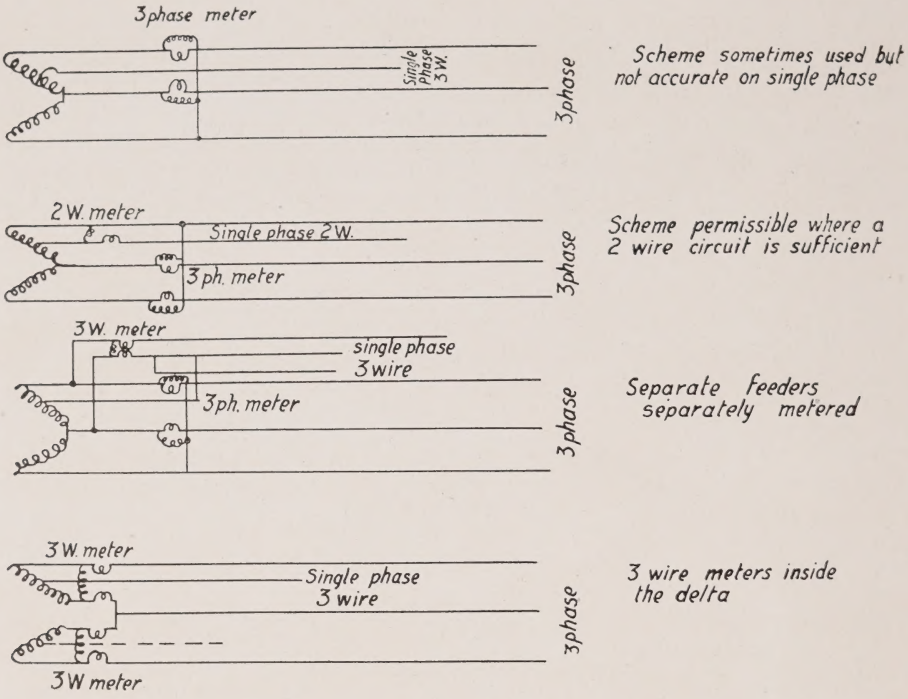
Measurement of Total Load on Combined Single Phase and Three-Phase Systems

By PERRY A. BORDEN
Assistant Laboratory Engineer, H.E.P.C.

IT is a common practice to supply a three-wire single phase circuit from one or more of the transformers making up a delta connected three-phase system. In such cases the metering of the total output of the transformers presents a problem which requires some special consideration.

A frequent assumption is that if the neutral of one transformer only be used and a polyphase meter so connected to the system that the leads forming the terminals of the tapped transformer are carried through the current coils of the meter, the total load will be correctly registered by the polyphase meter, provided the power factor of the single phase component be unity. A little study will, however, show that this system fails not only on low power factors but upon loads of unity power factor. This has been given a thorough analysis in the "Electrical Meterman's Handbook," and some rather surprising and interesting results have been deduced. The following points are brought out:—

"It would be possible to measure a non-inductive load tapped off in the above manner.....if the angle of displacement between the potential of the meter and the single phase current through the meter were exactly 60 degrees. . . . . This condition, however, cannot be at-



MEASUREMENT OF TOTAL LOAD ON COMBINED SINGLE-PHASE AND THREE-PHASE SYSTEMS.

tained. Even with a non-inductive load, the voltage triangle of the phases will be distorted by the reactance in the transformer winding changing both the phase angle and the voltage, ... the reactance voltage leading the current by 90 degrees."

A simple mathematical proof follows, in which it is shown how a lag of 5 degrees in the single phase current may introduce an error of over 15 per cent. in the measurement of that portion of the load. The results are then given of an actual test, using the system of connection referred to and supplying a current of 40 per cent. of the rating of the transformer between its neutral and one side of the single phase circuit.

"On a non-inductive load, the measurement was 119.0 per cent. of the correct load, the error being due to the impedance of the transformer alone. With a power-factor of about 99.7 per cent. the measurement was 133.6 per cent. of the correct load, showing an additional increase of 12.3 per cent. of the previous registration, due to the slight change in power-factor. This power-factor is about that usually obtained in lighting circuits, so that the method cannot be considered as even approximately correct."

It will be seen therefore, that a correct totalization of the load on such a system cannot be obtained with the ordinary type of polyphase wattmeter, and that other methods must be resorted to if such a load is to be measured. As solutions to this problem the following possibilities are suggested:—

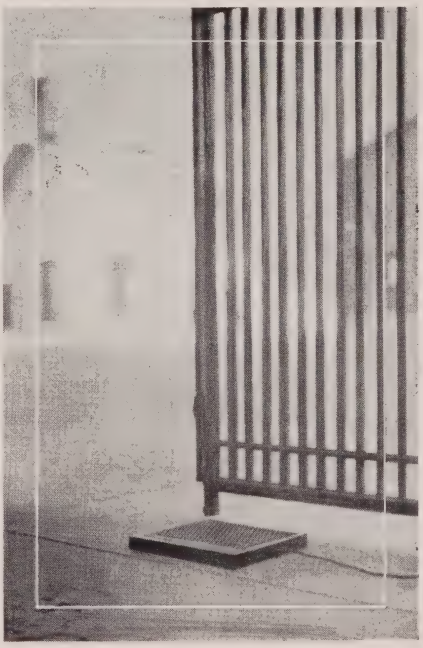
1.—If the total single phase load may be carried on a 2-wire system it is necessary only to use the neutral of one transformer and the outside wire which does not pass through the polyphase meter. This single phase load may then be metered separately on a two-wire meter. If desired, the neutrals of two of the transformers may be brought out, giving a three-phase 110 volt system which may be metered separately on a three-phase meter.

2.—The single phase, two or three-wire load may be separated form the 3-phase load and metered independently. This will require separate feeders.

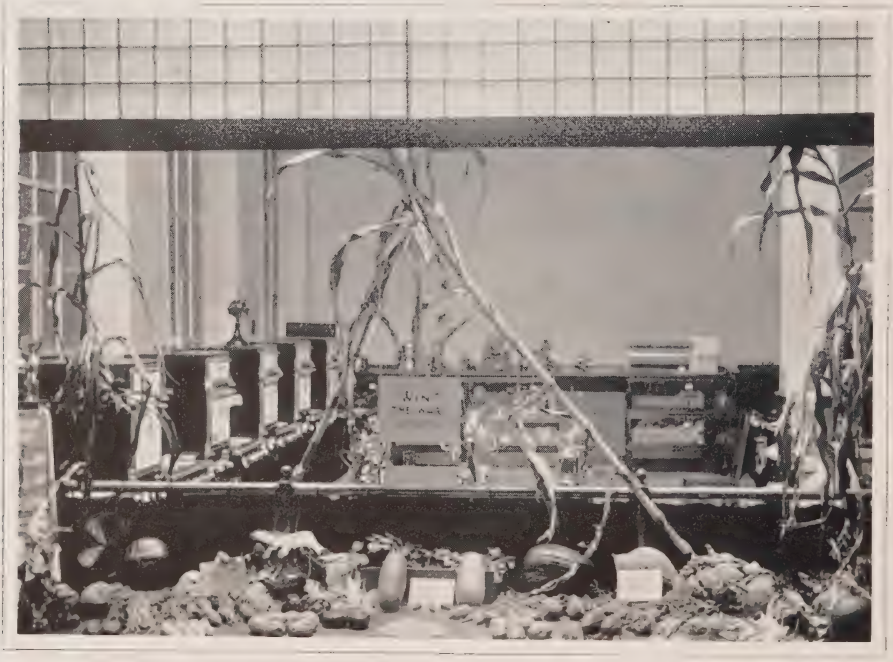
3.—Probably the most efficient method of measuring the total load is by the separate measurement of the power supplied by the different transformers. If a transformer supplies power to a two-wire circuit only, its total output may be measured by a two-wire meter. If it supplies a three-wire circuit, a three-wire meter will be needed. It is necessary therefore, only to equip each transformer in the set with a suitable meter connected *inside the delta*. As a two-wire load will be correctly measured by a three-wire meter, and as three-wire meters cost no more than two-wire meters; and, in 220 volt ratings are much easier to obtain, it is advisable to use three-wire meters entirely. Such an arrangement gives the total output of the transformers, irrespective of the nature of the load. To obtain the whole output is only necessary to add the readings of the two meters. If the demand were sufficient there is no reason why the manufacturers could not produce a two-element meter for such work, in a polyphase meter case. This system could also be used with an ordinary 200 volt 5 ampere polyphase meter, operated by current supplied from three-wire current transformers such as are produced by the Westinghouse Company.

(*Continued on Page 52*)

NOVEL ELECTRIC HEATER



An electric foot warmer used by the woman gate keeper at the Union Station, Ottawa



Top view: Appliance salesroom, Chatham (the picture was taken at night using normal lighting only). Below: Chatham Hydro-Electric System's employees war-garden exhibit

Bare vs. Weatherproof Covered Wires for Potentials Above 750 Volts*

By A. S. L. BARNES

Assistant Engineer, Hydro-Electric Power Commission of Ontario

THE object of this paper is to bring before you an oft-debated question of considerable importance to those interested in overhead distribution work.

Some time ago, the Chief Engineer of the Hydro Electric Power Commission of Ontario appointed a Committee on Rules and Regulations for Outside Overhead work, consisting of members of the engineering staff, and this subject was discussed on a number of occasions by that Committee, but without any final decision being reached, as there were warm advocates of each side of the question.

The Chief Engineer of the Commission was desirous that this matter should be brought before this Association and your Committee considered it well worthy of serious attention.

In the preparation of this paper, the object kept in mind has been to invite discussion of the subject of it rather than of the paper itself and it has therefore been my endeavour to marshal a few facts, together with the statements of various authorities regarding this question, in such a manner as to fix in your minds some concrete ideas out of which useful discussion may arise; if this results, the paper will have fulfilled its purpose and the intentional omission of many personal expressions of opinion will have been justified.

The N. E. L. A. Handbook on Overhead Line Construction dated 1914, contains the following under the heading of "Weatherproof Insulation":—

"A trade name for a character of insulation consisting of one or more layers of braided material, soaked in an insulating compound."

In another part of the book we find this:—

"In the manufacture of triple braided weather-proof wire, the wires are covered by three closely and evenly woven braids of a strong fibrous material after which they are placed in a hot bath of weather-proof insulating compound."

The Standard Handbook for Electrical Engineers, 1915 Edition, says:—

"The so-called weather-proof insulation becomes a reasonably good conductor when moist. Triple braid weather-proof conductors have three braids saturated with a so-called weather-proof compound, served around them. . . . . Triple braid weather-proof conductors are approved by the National Electrical Code for outside construction, but double braid conductors are not approved at all."

The National Electrical Code, 1918 Edition, states:—

"This wire is for use outdoors, where moisture is certain and where

* A paper, read at Convention of the Association of Municipal Electrical Engineers.

fireproof qualities are not necessary. The insulating covering shall consist of at least three braids, all of which must be thoroughly saturated with a dense moisture-proof compound."

One thing which has struck me rather forcibly about these extracts, is the use of the expression, "weather proof *insulation*," which is very commonly employed.

No one pretends for a moment that weather-proof covering is insulation, at least not for voltages from 2,200 upwards, so why call it by such a name?

The word "insulation" in connection with weather-proofing is a mis-nomer and I would suggest that "weather-proof covering" be used instead. The public, and particularly the legal profession, are seriously misled by the use of an expression for which no justification is to be found.

I observe also that while the National Electrical Code specifies the use of triple braid, it is common practice, apparently, in Canada, to use only double braid, indicating a difference of opinion as to the degree of "insulation" for which it is worth while to pay. The balance between safety and its cost is evidently not thoroughly established.

There are many conflicting ideas on the question as to whether the use of weather-proof covering should be continued or abandoned, for potentials above 750 volts, and it is believed that the following views expressed by various authorities will prove interesting here.

In the N. E. L. A. Bulletin for September, 1916, Mr. G. S. Humphrey, speaking of primary conductors, says:—

"As to whether wires shall be bare or insulated, we have been specifying that insulated wires shall be used only in Salt Lake, Ogden, Prora and Logan; bare wires being used in all other places unless insulated wire is prescribed by some local ordinance. We don't believe there is any real protection afforded by the standard weather-proof insulation, at least, if there is, it is only for a comparatively short time while a false sense of security because of the insulation may cause injury to someone. An insulated wire is more apt to be broken by the wind or sleet than the same size bare wire, and it cannot be held in place so well. The bare wire is, of course, much cheaper than the insulated, both because of the saving of the cost of the insulation and also because of the saving in cost of poles and fittings since longer spans may be used with the bare wire. The advantages of the insulated wires are that interruptions due to crossed wires may be slightly reduced."

In the N. E. L. A. Bulletin for November, 1916, in an article by Mr. A. S. Hall, occurs the following, which has reference particularly to rural lines:—

"The insulated copper which has in the past been regarded as proper for city uses is entirely out of place in rural construction. It shortens the span, thereby increasing support cost and the insulation does not add any great factor of safety in the rural districts."

Below is an extract from the *Electrical World* of January 31st, 1914, taken from a report of a

paper read before the Western Association of Electrical Inspectors on Whether 2,300 Volt Primaries should be run without insulation on the conductor itself:—

"Mr. McGann has conducted at the electrical laboratories of the city of Chicago a number of tests on various samples of weather-proof wire to determine the effectiveness of the insulation as a dielectric after different periods of use. These tests were made on dry and immersed samples, new and in service for three, five and ten years. While new wire with moisture repellant still in place withstood four times the normal voltage of the lines, wet samples barely withstood the line voltage to ground, but showed a good factor of safety for line crosses where the insulation of two wires is interposed. Samples taken out of lines which had been in service several years, had lost very considerably in dielectric strength dry, but even more wet, and none but the new wire gave an insulation test indicating reliable protection for line men on poles. The tests show that in general even wet insulation may, for 2,300 volts, be depended on for ten years, if the insulation remains intact, to prevent break-down when wires of opposite polarity swing together. Mr. McGann drew the conclusions that present standards of weather-proof insulation give a distinct advantage over uninsulated wire by protecting against primary contacts to secondary, promoting continuity of service and protecting linemen in dry weather or with new insulation. Mr. McGann concluded with an earnest plea for a better insulation for overhead wires, asserting that dearer line construction would be repaid by greater safety to life and apparatus and by continuity of service, and suggested that the overhead wiring committee bring in at its next meeting specifications for such an insulation.

"While not intended as at all exhaustive, this series of tests marks a real advance in the present knowledge of the value of weather-proof insulation for 2,300-volt construction. The question of 6,600-volt construction was not touched on, and at least for present insulation, Mr. McGann recommended the use of insulating gloves by linemen working on live 2,300 volt lines"

In 1917 some tests were made by the Hydro Electric Power Commission on double braid weather-proof covering, the results of which are given below:—

COMPARATIVE TESTS ON NO. 6 B. & S., D. B. WEATHERPROOF M. H. D. COPPER WIRE

Weight, lbs. per 1,000 ft.		Tensile Strength		Insulation Resce. Megohms per mile		Break-down Voltages		
Bare	Covered	Wire (lbs.)	Lbs. per Sq. in.	Dry	15 hrs. Immersion	New	After Baking	After Boiling
A. 77.06	100.7	740	37,000	23.6	3.85	3,600	2,000	800
B. 78.64	101.8	713	35,500	12.5	2.74	3,000	1,200	800
C. 80.77	103.5	736	36,800	17.75	2.94	1,200	2,600	800
D. 79.25	102.1	722	36,000	*35.5	*3.42	1,200	2,600	800

*Comparative figures only. Not sufficient length of wire used.

These tests were not at all exhaustive, but the records of breakdown voltages, it will be seen, are too low for safety and are also erratic, showing that no reliance can be placed on such covering—this, of course, is a well-known fact, but the figures corroborate it.

The following is taken from Bulletin No. 75, Circular of the U. S. Bureau of Standards,—"Safety for the Household."

"In this connection it should be understood by all members of the household that the *insulating covering on high voltage wires cannot be depended upon* for safety of persons touching them. It is not feasible to maintain reliable insulating coverings in swaying overhead wires, such insulating coverings as they do have, serving principally to minimise the probability of short circuits between wires and their consequent breakage when crossed by fallen twigs or by other wires."

Later on, this sentence occurs:—

"Insulated overhead wires should be treated the same as bare wires since the insulation quickly becomes defective in outdoor use."

I would like to say here that the use of the word "insulated" in the last quoted sentence appears to be particularly unfortunate as it decidedly gives the impression that the covering when new is a fairly good insulation.

Mr. S. B. Hood, whose name is probably well-known to all of you, was reported in the *Electrical News* some time ago as saying:—

"Insulation which is not a protection is a death trap and its omission is both a safeguard and an economy."

Below are quoted, successively, letters from various authorities in the United States to whom enquiries have been addressed regarding the subject of this paper:—

Letter dated September 19th, 1918.

"Dear Sir:—

Referring to your letter of August 31st, addressed to the National Electric Light Association, inquiring as to the views of the Commissioner on the subject of "Bare versus Weatherproof Wires for Potentials above 750 Volts," I will endeavor to give you what I believe to be the consensus of opinion of those who are operating distributing systems throughout the States.

In the Eastern part of the States, it is very general practice to use weather-proof insulation on all wires erected in the built-up portions of cities. This is done quite generally on voltages up to 13,000 and in some cases on higher voltages. The use of weather-proof insulation on circuits above 7,500 is chiefly a matter of complying with municipal ordinances which are designed primarily to cover the ordinary distributing circuits operating at voltages below 7,500. These ordinances in most cases do not discriminate between distributing and transmission voltages, and weatherproof wire must therefore be used within city limits in order to comply with the Law.

In smaller towns and in the far west, it is not unusual to see bare wire used on distributing circuits up to 7,500 volts.

In large systems where there is more than one arm on a pole and

where it is customary for men to work on the lines alive, the use of bare wire is not considered safe for linemen.

Weatherproof insulation is not considered as a complete protection to linemen against ordinary distributing voltages under 7,500 volts, but taken in conjunction with the wooden poles is a very material aid in avoiding accidents. Companies operating the larger systems usually have rigid rules requiring joints to be well taped, and permitting no bare connections of any sort on poles where men are required to work. It is customary, however, to use rubber blankets or other protection, as the condition of insulation of various ages is uncertain and cannot be wholly depended upon.

The presence of weather-proof insulation is of considerable assistance in minimizing damage to communication systems which may become crossed with lines operating at voltages below 7,500 volts, and there are numerous cases on record where crosses of this kind have occurred in which the insulation has protected the communication circuit from damage.

At voltages above 7,500 the insulation ceases to be a material protection, either to linemen or to communication circuits, and the use of weatherproof insulation, therefore, involves an additional investment which does not appear to have compensating advantages.

I am not sure whether this is the sort of data which you are seeking in the matter, but from a wide acquaintance with engineers who are operating such circuits and with committees who have assisted in making safety rules affected by this question, I believe that the above is a fair statement of the situation in the States.

Yours very truly.

(Signed) H. B. GEAR,
Chairman,
Committee on Overhead Lines
and Inductive Interference,
N.E.L.A.

Letter dated October 9th, 1918.

"Gentlemen:—

Replying to your inquiry of October 3rd, we are unable to advise you at the present time of any city which specifies the use of bare wires for overhead electric lines above 750 volts.

It is generally conceded, however, that weatherproof covering on such wires deteriorates very rapidly and it is doubtful whether any useful purpose is achieved by requiring such a covering. It is sometimes claimed that hazard is increased where such a covering is used on account of the false sense of security suggested by the presence of insulation which may be inadequate and hence dangerous.

Since the National Electrical (Fire) Code requires this insulation, it is used by many utilities who do not approve of it merely in order to conform to the rules. It would seem very desirable to obtain wider experience in the use of bare 2,200 volt lines in order to demonstrate the question of relative hazard.

Respectfully.

(Signed) S. W. STRATTON,
Director, Bureau of Standards,
Washington, D.C.

Letter Dated October 24th, 1918
Use of Bare Wires for Distribution Circuits

"Dear Sir:—

In replying to your inquiry of the 19th, relative to the use of bare wires for overhead distribution circuits above 750 volts, we would offer the following as expressing our opinions covering the various points which you mention.

Our practice is in favour of bare wire for primary distribution circuits. For voltages 6,600 v. and over, we invariably use bare wire unless local regulations require the wire to be insulated, in which case we endeavour to secure a modification of the regulation. For 4,000 v. and in general, for 2,300 v. we use bare wire where Governmental and local requirements do not conflict. The following opinions have been reached as a matter of judgment from our operating experience in various parts of the country, rather than from compilations or analyses of statistics.

The slight temporary and generally undependable protection afforded by the covering is usually more than offset by the largely increased wind and ice loadings which the covering occasions. Bare wires are less likely to stretch or break, are steadier in the wind and impose less loads on fastenings and structures. We have heard the statement that sleet forms less readily on bare power wires, but we have no knowledge as to this point.

On lines with suitably spaced and supported conductors, the tendency to interruptions from swinging crosses is so largely decreased as to be more than outweighed by the more frequent troubles such as broken conductors and crosses and stretched conductors, which result from the use of insulation; that is, there is a net gain against interruption by omitting insulation.

While in a liberal percentage of cases of contact, insulation may afford protection against shock to linemen working on live wires, the presence of insulation creates a false sense of security on the part of the workmen, which tends to carelessness. The only safe rule for linemen is to treat all primary wires as if bare, and this rule will be more effectively observed if the wires actually are bare. When live primary wires are to be worked upon the use of protective devices, such as portable shields, are much more effective protection to linemen than insulation on conductors.

The use of covered wire is more expensive, owing both to the greater initial cost and to the fact that the wire must be replaced when the covering begins to disintegrate.

We trust that we have covered this matter in accordance with your desires.

Yours truly.

(Signed) R. J. McLELLAND,
Chief Engineer,
Electric Bond & Share Co.,
New York.

So far as I have looked into the question, there seem to be four main points on which opinions differ, and if a suggestion as to procedure be not out of place, I would propose that discussion be centred around these points, preferably in the order

given so far as it is possible to treat of them separately:—

The four points are:—

1. Safety.
2. Operation.
3. Cost.
4. Public opinion.

These main headings may also be sub-divided, in their relation to other factors, as follows:—

1. Safety (in erection, operation and maintenance).

To— (a) Power linemen.
(b) Telephone and telegraph linemen.
(c) The public.

2. Operation.

Of— (a) Power lines,
(b) Power stations and sub-stations,
(c) Telephone and telegraph systems.

3. Cost

Of— (a) Wire,
(b) Labour,
(c) Operation,
(d) Maintenance.

4. Public opinion.
(a) General Public Opinion,
(b) Opinion in the Law Courts.

At this stage I will leave matters in your hands in the hope that the subject has been so presented that profitable discussion, leading to definite conclusions upon which decisions as to future action can be based, may result.

"The Advisability of Electric Companies Handling Appliances and Supplies and Maintaining Standard Prices as Established by the Manufacturers"

By W. B. JOHNSON

Manager, New Business Department, Montreal Light, Heat and Power Consolidated.

"THE Public be Damned" policy assumed by so many of our public utilities a few years ago has now been changed to a "The Public be Pleased" policy and it was well that they saw the wisdom of this change for there are very few companies that, had they still continued with their old methods, would be operating to-day.

Until about fourteen or fifteen years ago, electric companies had been content to take such business as came into their office but made

Editor's Note—Owing to the unavoidable absence of Mr. Johnson, his paper was presented by Mr. E. H. Porte, General Manager, Renfrew Electric Mfg. Co., Ltd.

no systematic nor special effort to secure any additional business. It was also considered, at that time, that when you had once established your service to the premises, that there was nothing further to be done but render the monthly bills and to see that same was paid. It was also considered undignified for an electric company to send out representatives to secure additional business and to endeavor to increase the consumption of a consumer by showing him where and how he would benefit by using more of our service.

Since the universal adoption of the present high efficiency lamps, how many plants are there that would be earning their bond interest to-day if the standard of illumination had not been more than trebled and the use of current consuming devices so universally approved by the public.

Up to the time that electric companies started to handle appliances there were very few on the market and also very few manufacturers. There is no question but that the appliance business would never have amounted to very much if the central stations had not taken hold and pushed the sales.

At first most companies used to sell irons, which was the principle appliance sold, at the actual cost of the iron, without allowing anything for overhead or selling expenses and generally the cost of selling the iron would amount to as much as, or more than was received for it.

Some companies used to buy irons by the thousands which they would give to their customers absolutely free of cost, provided they were used on the company's service.

These methods of getting appliances in use on their lines, were no doubt very effective at that time, but there have been great changes since then. At that time they used to figure that an iron meant a revenue of $1.00 per month, and I guess you will all agree that if under our present rates, we could secure such a revenue from each iron, that we would gladly see that each of our customers had one, and that same was kept in good repair. At our present rates we are very thankful to obtain a revenue of 50c. per month from each iron sold.

It is pretty hard to state what the actual revenue from different appliances amounts to, as conditions vary so greatly, and while it is not very much from anyone, still it amounts to a fair sum for the total number in use.

With most companies the revenue for current used by small electric appliances is practically NET PROFIT for your service is established, and your investment is not increased.

You will also very often find that the desire for some appliance is responsible for the installation of wiring and fixtures for lighting.

I have never yet heard of a central station selling appliances just for the profit in the sale—but rather for the revenue to be derived from the use of that appliance. If this be so, then, it is up to us to get all the appliances in use that we pos-

sibly can, providing the cost is in proportion to benefits to be derived.

How many of you managers and engineers can say that you have in your own home all the different current consuming appliances that can be profitably used? If you who know all about these appliances have not been convinced of their desirability, then think how much more difficult it will be to convince a person who does not know anything about them.

How can you expect an electrical contractor, hardware merchant, or departmental store to take the time or to spend the money to educate the public to the use of appliances as long as they are only interested in the profit from the first sale?

How many manufacturers are there to-day that depend upon some other organization or person for the sale of their goods unless they have some guarantee as to sales? You often hear of manufacturers who have previously sold their output through special selling agents and who have given up that method and are looking after the sales with their own employees—whether through jobbers or retailers.

As soon as business conditions become normal, you will find that a number of manufacturers of other lines will open retail branches in the larger cities, not with the idea of taking the sales away from the present merchants, but with the idea of increasing their sales in that locality.

I firmly believe that should electric companies discontinue the development and sales of appliances, that not only would the sales of such appliances greatly decrease, but that gradually the use of such appliances as are now in general use, would be discontinued.

I do not mean this as any reflection on the selling ability of electrical contractors or other merchants but is due to the fact that they would not have the interest in the sales that a central station does.

If you will investigate you will find there are a very much greater number of appliances in use in the cities in which the electric companies promote and push the sale of appliances than where the sale is left entirely to dealers.

The public expects the electric company to not only handle all the latest appliances, but to handle the best and at a fair price. Should they discontinue the sale of appliances, the market would be flooded by the unreliable "fly by night" merchants with cheap, worthless and very unsatisfactory goods. This, you know, would hurt our business, the selling of electric current, more than one would think and would also kill the sales of reliable dealers.

Does the sale of appliances by central stations affect the sales of reliable dealers? Absolutely not, provided they both maintain standard resale prices which without a doubt all should do.

Where central stations push the sale of appliances it means increased sales for all dealers. Every appliance sold, provided it gives satisfactory service, helps sell other appliances.

The question of central stations maintaining standard resale prices on appliances has been discussed for many years until to-day you will find very few who will advocate any other policy. We must bear in mind that the price, as long as it is reasonable, does not sell nor hinder the sale of appliances.

The contractor-dealer cannot continue in business very long unless he can make a profit on the goods he sells, so that if you cut prices, you are forcing him to the wall or to get out of that part of his business.

Now place yourself in his position and how would you feel toward central stations? You certainly would not feel like getting out and boosting for them.

The merchant who makes a fair profit on appliances sold is going to boost and recommend them to all his customers, and if he succeeds in closing the sale will make a little profit, whereas you will make a profit every month that it is in use on your lines.

You operators of municipal plants as well as we, need all the friends and boosters that we can get, and such friends can do more harm or good than one would suppose.

If we cut prices it means that the other merchants must discontinue selling appliances and that we would, therefore, sell more, but that does not mean that we would have any more in service on our lines.

By maintaining prices we have that many more salesmen working for the company without being on our payrolls.

At the present rates for electricity what company can afford to sell goods at less than cost, for if your rates are so high that you can, then you are not playing fair with the public, and are charging some of your customers more than you rightfully should.

The question arises as to what is a fair resale price—for I must admit I do not consider some of the prices established by the manufacturer as being fair to the smaller retailer. I believe that resale prices should be based on the average costs of contractor-dealers, plus a fair margin of profit which would no doubt be higher than if based on the costs of a public utility.

Every cent of net profits derived from the sales of appliances, together with such additional amount as your directors will permit, should be spent in educational, sales, and good-will advertising.

There are cities to-day that sell two or three times the amount of appliances per person than other cities do, but the time is coming when the sales in even these cities will amount to treble what they are to-day. That day will be when the public is fully informed and convinced of the advantages of electrical appliances.

The manufacturers are doing a great deal to spread this information, and it is up to us to look at the matter squarely, and consider whether we are doing our fair share. We must bear in mind that the manufacturer makes only the profit from the sale, where as we make the

profit from the sale and also obtain revenue for current used by that appliance as long as it is on our lines. You benefit both directly and indirectly by every piece of advertising that you put out and every contractor-dealer and appliance manufacturer also profits by it.

I do not believe there is any question but that it will be greatly to the benefit of Central stations when the plan or platform drawn up by Mr. W. L. Goodwin, is adopted by all the electrical interests.

Far more can be done towards educating the public by all the electrical interests working together than by working singly.

The selling of appliances is a merchandising proposition, and the sooner we adopt the methods of some of our best and greatest merchants the better it will be for us.

Hardware dealers and druggists have lately started to handle appliances and the only reason they have made the success thay have, is due to the fact that they understand merchandising. Central stations should make a serious study of this subject and we in turn should give the contractor-dealer the benefit of our knowledge.

They, as a rule, are not very good merchandisers, but I am glad to say that there are some who have seen wherein they would profit by same and are now leading the central stations.

Trade papers have taken up this subject lately, and should be commended for the very good work they are doing. We should not only read and study these papers, but should see that our employees are given the opportunity.

I am sorry that I cannot give you any interesting figures as to appliance sales for the reason that we are a combination company.

I will state, however, that we have four branch salesrooms or offices which are absolutely self-sustaining, that is, the profits from the sales of appliances (gas and electric) more than pays all the expenses of the branches. We obtain no credit for current consumed by appliances sold.

We believe in having as nice branches as the locality will permit, but things can be overdone, and a place fitted up so grand that is will not do you the good that a less pretentious one would.

There is no question but that a neat, well arranged office will help your sales a great deal, provided same is properly managed.

The question of central stations handling neutral or allied lines has been discussed for the past year or so, and I believe, that it would be well for all to look into the matter. Personally, I am a firm believer in same, but it might not be advisable to adopt it in some cities.

With central stations it should not be a question of handling appliances and at resale prices, but rather the best merchandising methods to pursue.

Sad Death from Electrocution

THE recent sad death of a Toronto professor was precipitated by what is considered a trivial matter and a danger which is hardly recognized by those in the electrical business.

The professor's death was precipitated by handling an ordinary portable lamp, something which is done every day in all sorts of places by all sorts of people, few of whom realize that it is decidedly dangerous and has during the past few years resulted in several electrocutions, all of which are recorded and known to the Inspection Department. It is, however, worthy of note that in every case recorded in the office of the Inspection Department the portable lamps responsible for the fatalities were defective and not in accordance with the Commission's regulations. It is also safe to assume that had they been of an approved type these accidents could not have happened.

There were two causes which contributed to the electrocution. One was that the transformer secondary was not grounded, as required by the rules and regulations of the Commission, and the other was that the portable lamp was defective inasmuch as there was no insulating guard around the lamp socket and he was carrying the lamp socket in his hand at the time. The deceased was under one of the boilers taking some measurements and was heard to cry out and while he was apparently alive when removed, he expired shortly afterwards.

Investigation revealed the fact that there was approximately 206 volts to ground and that he received this voltage through his body. Had the neutral of the transformer supplying the circuit) from which he received the shock) been properly grounded it would have reduced the potential he received by one half. Whether this would have saved his life no one can state positively. At all events there would have been the satisfaction of knowing that at least this precaution had been adopted.

The lesson to be taken from this accident is the necessity of providing proper portable lamps for around factories, sub-stations or other places where they may be required and not trust to long pieces of cord with brass sockets or other makeshifts. Superintendents, foremen, managers or other officials in authority should put their foot down on the use of this type of substitutes for proper portable lamps and not wait until a fatality occurs and they find themselves called upon to answer for negligence and perhaps incur for a lot of expense, to say nothing of the remorse which would be involved in such omission on their part.

Touching on the legal side of this question, no doubt the expert testimony which will be called in, will

prove very confusing to an uneducated jury. Imagine a juryman who has no knowledge whatever of electrical terms or technicalities, listening to some of the evidence which will be brought forth. How would he decipher the following statement which will most probably be made by someone?—"It appears that the deceased met his death on account of one side of the circuit being grounded and being under the boiler he was grounded on a brass socket and received 206 volts to ground because the secondary was not grounded." In other words, he received extra high potential because the wire in the circuit was grounded and if the circuit had been grounded the shock would only have been half as great. Another way of looking at it is that the best way to prevent circuits from becoming grounded is to ground them.

The record of this accident could easily, with the foregoing remarks, lead into a long treatise on the question of grounding, which is not intended at the present time, but inasmuch as the proper grounding of neutrals of secondaries carries with it the certainty of receiving the full low potential voltage to ground, whatever it may be, it behooves everyone to adopt such precautions as have been described to protect against the low potential danger which has been proved to be quite real, and leave the grounding to protect against high potential which it certainly will do if properly carried out.

Captain Hodge, M.C., Dies in Hospital

THE following is taken from the *Vancouver Daily Sun*.

Captain Harry E. Hodge, M.C., a returned officer of the First Contingent, died at the General hospital last night after a short illness. In his death another of the soldiers who made Canada famous in the early days of the war has gone and the thinning ranks of the First Contingent has lost one of its most brilliant officers.

Captain Hodge went over as a lieutenant with the original 2nd Battalion in 1914 and took part in the early fighting in the Ypres salient. At the second battle of Ypres, where the Huns used the first gas in the war, Captain Hodge was in charge of a machine gun crew and, after all his men were killed, he held his post firing into the masses of the enemy with such effect that he completely held up their advance at that point. After the battle by official count, there were no fewer than 675 German bodies in front of the machine gun emplacement held by Captain Hodge. For this he was recommended for the French Legion of Honor, mentioned in despatches and promoted to the

rank of captain on the field, as well as being personally congratulated by Premier Lloyd George on one of the latter's tours of the front.

He was wounded in this engagement and returned to Canada, but as soon as he was fit again, returned to the front and took part in the Somme battles of 1916, winning the Military Cross and the personal thanks on parade of General Byng. Wounded again, he was sent to England, and for some time was musketry officer in the Shorncliffe area for the Canadians. For the second time he was returned to Canada and this time was placed on the reserve of officers and retired to civilian life.

The presentation of the Military Cross was delayed for some time and when Captain Hodge received it he was living in Bellingham, Washington. Permission was obtained to present the decoration to him there and it was done by the senior officer in the military district. The presentation on American soil was the first ever made to a Canadian officer and excited great interest at the time.

For the past six months Captain Hodge had been working as an electrician in the Squamish, and it was there that he contracted the influenza that resulted in his death. He was hurried to the General hospital as soon as possible but the dreaded disease had taken an acute form and he died in a very few days.

Captain Hodge, before his enlistment, was employed by the Commission on the Central Ontario System at Campbellford, and was extremely popular among the employees on that system. His death is a matter of deep regret to the staff and his numerous friends.

Notice to Manufacturers

All manufacturers of portable heating and cooking appliances are hereby required to take notice that they must provide forthwith a plainly printed and properly attached tag or label on all devices consuming more than 660 watts when shipping such devices from the factory and should also send out such labels or tags to local distributors in Ontario for attachment to all such devices as have not yet been sold to the consumer.

This tag or label must bear the following wording:—"This appliance is NOT suitable for connection to lamp sockets or Edison base receptacles, but must only be connected to receptacles and circuits having, at least, as great carrying capacity as called for on the nameplate of the appliance."

All such appliances, as noted above, which do not bear this tag or label by February 1st, 1919, will not be approved for sale or installation in Ontario.

Who's Who in Hydro?

J. E. B. Phelps, manager of the Sarnia Hydro-Electric System, was born in Springford, Oxford County, Ontario, in 1873. He received his early education in the public school at Springford, and later at Otterville. At the early age of eleven years he had to leave school and start out to earn a livelihood, and began working in a grocery store at Point Edward.

J. E. B. PHELPS

In 1900 he secured a job as fireman for the Sarnia Gas & Electric Light Company, then under the able management of Mr. Wm. Williams, one of the pioneers of the electrical industry in Canada. Mr. Phelps soon saw the great disadvantage in which he was placed in the engineering field by not having had an opportunity of obtaining an education, and at once enrolled for a course with the I. S. C. Although at this time was working on a daily shift of twelve hours, seven days per week, he found time to pursue his study and obtained his diploma. He also holds a first-class engineering certificate from the Ontario Association of Stationary Engineers.

Mr. Phelp's advancement with the Sarnia Gas & Electric Light Company was rapid, and three years after starting in their employ, found him occupying the position of chief engineer and electrician. He saw the plant of the Sarnia Gas & Electric Light Company grow from a small one containing a 500 light A. C. generator and one Wood Arc machine of 50 light capacity, to one with a maximum capacity of 3,000 h.p.

In June 1912 the plant, with the exception of the boilers, was totally destroyed by fire, and the company called in J. O. B. Latour, who designed the new plant, Mr. Phelps acting as resident engineer and supervising the erection of the building and installation of the machinery. This new plant was considered by engineers to be of the most modern and economical for its size in Ontario.

In June, 1916, the plant and distribution system of the company was taken over by the city and Mr. Phelps was appointed manager.

The introduction of Hydro meant complete rebuilding of the distribution system and sale of the general equipment in the power house. To dismantle this machinery and install Hydro equipment in its place, as well as rebuild the distribution system and at the same time give the citizens service, re-

quired some engineering, and Mr. Phelps received much praise from the citizens of Sarnia on his success.

Mr. Phelps married Flora Catherine Johnson, daughter of Charles L. Johnson, in June, 1902, and has one son.

He is a prominent member of the Masonic fraternity and at present holds the office of Grand Sword Bearer in the Grand Lodge of Ontario A.F. & A.M. He is also Past Grand Patron of the Order of the Eastern Star in the Province of Ontario, and is an ex-alderman of the City of Sarnia.

Letters from Readers

Editor, THE BULLETIN:—

We were very much interested in the article appearing in the October issue of THE BULLETIN under the heading "This Matter of Selling Appliances."

We are particularly interested in the development and sale of electrical appliances, and are therefore pleased to have this opportunity of stating our case.

(1) *Why We Are In Business*—In order that we may be in a position to place before our consumers the various appliances which they from time to time require for their convenience and enjoyment: to introduce and give the service necessary on new appliances which are coming and will continue to come on the market in great numbers; and to assist in every way the dealers and contractors of our city (whom we have every reason to believe are selling a great many more appliances since we entered the field); because we have a name that carries the same guarantee in the electrical world as the Bank of England carries in the financial world, and so the public naturally come to us; because the profit on the sales department pays the salaries of our staff of experts who care for our customers' desires, and give information and advice on their electrical problems. Even without a sales department this staff would be necessary in the interests of good service, and would be a charge against general operation.

(2) *How We Do Business*—By selling service and satisfaction; by maintaining a competent sales staff, and a first-class installation and repair department; and by adhering strictly to resale prices.

(3) *Why We Are In Business To Stay*—Because of our established reputation, together with the fact that we stock only saleable goods of reliable manufacture which have been tested in the laboratories of the Hydro-Electric Power Commission of Ontario; because we purchase at the best prices obtainable, making a fair margin of profit; and because public sentiment demands that we stay in business.

Our general manager, being a Rotarian, insists on the department and staff adopting the Rotary Motto "He profits most who serves best."

Yours truly,

Public Utilities Commission,

G. W. Blay,

In Charge of Sales.

Lamp Advertising

By J. F. S. MADDEN

THE lamp advertisement which appeared in our January number, the one in this issue and those to follow in subsequent issues are samples selected and adapted from a series of advertisements which the Canadian Laco-Philips Company has arranged with the Commission to run. These advertisements are mainly educational and intended to emphasize the importance, when purchasing lamps, of not only considering the initial cost, but the candle power and the life as well, as these factors determine the real value of the lamp. On account of the different considerations that determine lamp quality it has always been difficult to judge the relative values of different lamps.

We have made it a practice to test out the different lamps appearing on the Canadian market, and have been purchasing lamps that our tests show represent the best value. The Hydro lamps are made to our own specifications, and lamps picked at random out of each shipment are carefully tested, so that we can be certain that the lamps we are selling conform to our specifications as regard light and life. There is, as far as we know, no other organization in Canada buying lamps under the same conditions.

If your customers are made to appreciate that not only the initial cost, but also the candle power and life of a lamp determines its real value, there should be a Hydro lamp in every socket where Hydro current is used, and universal satisfaction, due to the fact that our lamps are purchased on strict specifications, drawn in the interests of the users, and carefully tested to insure that the standard of quality demanded by our specifications is consistently maintained.

Electric Signs

A manufacturer of electric signs recently made the statement that in the last few years he had installed four hundred thousand lamp sockets in signs. It is possible that the local managers might do much to encourage the use of electric signs. The moral effect of a well lighted sign on the business streets of the town is undoubtedly of even greater importance than the value as a load builder. It would seem that the best way to encourage the use of signs would be by setting an example. If you are interested communicate with the Sales Department. Arrangements can be made for a standard sign for Hydro Shops, if a sufficient number of towns will signify their intention of improving their store front in this way.

The question of whether the Hydro municipalities shall engage in the sale of lamps and appliances is in our opinion a matter of considerable importance to all the Hydro municipalities. The question is one which must be settled by each municipality. It is quite possible that two local managers, equally capable and honest, responsible for the successful conduct of the business of the local utility or system, might decide this question, the one for, the other against the distribution of lamps and appliances. Outside of purely local conditions which, of course, often influence the decision, the local commission will naturally look to their manager or engineer for advice on this matter and will in all probability be guided by his judgment. As this is a question upon which there has been in the past an honest difference of opinion, the papers selected for the January meeting of the Association of Municipal Electrical Engineers, were certainly very timely.

There may be some questions as to the size of the town that can economically open a store for the handling of appliances, but we do believe that there should be no question as to whether or not the large towns should develop this service to the very limit of their ability. If individual engineers differ on this question, it is one of such importance to the successful and complete development of the local systems that the decision should be largely influenced by the consensus of opinion of the municipal engineers as a body with their combined experience and knowledge of the practice followed by the large and successful corporations operating throughout the country. Local commissioners and engineers throughout the system should be well repaid for their attendance at the Convention, if it leads to the adoption of a more or less uniform policy in respect to this matter of selling appliances.

Measurement of Total Load

(*Continued from page 33*)

If a third transformer be added to the system, thus completing the delta, it, also, will require a meter to measure its share of the load; and in such a case the two-element meter will not suffice.

Hydro News Items

Eugenia System

EUGENIA DEVELOPMENT:—The extension to the Eugenia power house is rapidly nearing completion, and it is expected shortly after the first of the new year that the third unit which is being installed by the Commission at this development, will be placed in operation.

ARTHUR—Extensions are being made to the distribution system in the Muncipality of Arthur to take care of additional load for an existing customer, and to supply power to a new industry.

Additional connected load of approximately 45 H.P. will be served from the new extensions.

FLESHERTON: — Extensions are being made to the distribution system in the Municipality of Flesherton to take care of supplying power to an additional customer.

HANOVER: — The reconstruction of the distribution system in the Municipality of Hanover has been completed, and several new power customers have been connected and served with Hydro power since the purchase of the utility by the municipality.

HOLSTEIN:—Extensions are being made to the distribution system in the Municipality of Holstein for the purpose of serving a new industry.

NEUSTADT: — The reconstruction of the distribution system in the Village of Neustadt is progressing favorably, and it is expected that work will be completed shortly after the first of the new year. The Neustadt System was originally the property of the Hanover Electric Light and Power Company, which system was recently purchased by the Commission.

Wasdell's System

BRECHIN: — Preparations are being made for increasing the installed capacity of one of the power customers in the Village, and extensions are about to be made to the distribution system to take care of this additional load.

BEAVERTON:—The load in the Municipality of Beaverton is steadily increasing, and arrangements are being made for providing for a considerably increased demand in the near future.

An extension was constructed during the past season into the summer residential district, and arrangements are being made to extend this line so as to take care of large number of additional rural customers.

New Equipment at Windsor

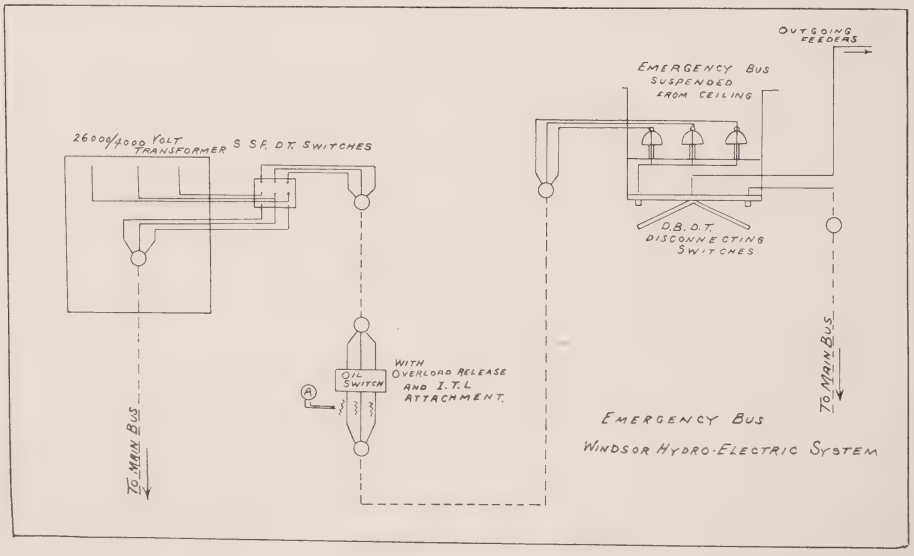
By O. M. PERRY
Manager, Windsor Hydro-Electric System.

WINDSOR'S municipal substation, like many others, was equipped originally with only one set of bus bars and provided with no disconnecting switches between the feeder oil switches and the bus. This condition was very liable to cause embarrassment should trouble develop in a current transformer or oil switch as there was little chance of effecting any repairs without a complete interruption of the low tension service.

As the Provincial Commission has duplicate equipment on transmission lines, and high tension substation equipment, it seemed rather inconsistent to the Local Commission that this idea should not be carried out in the Municipal Stations as well.

Consequently a second 4,000 Volt bus was installed in Windsor Station suspended from the ceiling near the point where the low tension feeders pass up the wall before going out of the station. Underneath this bus is a row of double bladed, double throw disconnecting switches, the centre terminals of which are connected to the out-going feeders, the second set connected to the new bus and the other terminals to the old, or main bus. To provide more room the low tension lightning arresters were placed outside the station.

The new bus cannot be regarded as a duplicate bus strictly, but more of an emergency nature, capable of



carrying two or more circuits during the period of heavy load and all the station during Sundays and other light load periods.

Current is supplied the emergency bus through an oil switch placed on the totallizing panel of the station and fed from one transformer the secondaries of which are broken and taken to a double throw disconnecting switch placed on the wall. By means of this switch the transformer can be used to feed either the main or the emergency bus.

Another advantage of having disconnecting switches on the lightning feeders is, that in case of outside trouble on one primary the disconnecting switch on that feeder can be opened, thus allowing a continuance of service on the other two phases, providing of course there are no polyphase motors being served by this feeder.

All material for this extra equipment was furnished by the Canadian Westinghouse Company and installed by the Windsor Commission.

NOTICE

The attention of Hydro Superintendents and others interested is drawn to Rule E, page 52, Fifth Edition of Rules and Regulations. The Electrical Inspection Department is notifying all inspectors that this rule must be observed.

In a few cases recently work has been started contrary to this Rule, involving a considerable waste of time and money to change, and the Electrical Inspection Department is expected to assume the onus of the violation of the rule, which can hardly be considered as just or proper.

The Commission has adopted this Regulation and it should be observed by all Hydro municipalities, to say nothing of outside interests.

When the News of Victory Reached Old London

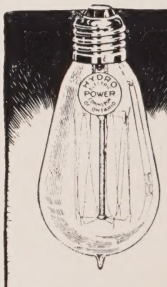
One of the first acts of a joyful populace was the removal of the blackening that for four long years had been painted on the street lamps.

London and all England—aye, and Paris, too—turned on the bright lights. The action is significant in two respects. Firstly, you can't be joyful in gloomy surroundings—and secondly, you can't have blackened bulbs and good light.

Have you BRIGHT lights in your home, or factory, or store? Are your lights DULLED—not by a war regulation, but by an unseen painter: by the burning out of POOR filaments in CHEAP lamps?

DON'T BUY POOR LAMPS. Turn on the bright lights—avoid disappointments. Let QUALITY lamps be your choice—let them be Hydro.

HYDRO QUALITY LAMPS



Proved by test the highest Quality Lamps on the market. Each lamp guaranteed for 1,500 hours, as against 1,000 hours claimed by competitive makes.

HYDRO LAMPS LAST 50% LONGER AND GIVE THE SAME LIGHT.

Hydro Municipalities

NIAGARA SYSTEM

25 Cycles

	Pop.
Acton	1,570
Ailsa Craig	462
Aylmer	2,119
Ayr	780
Baden	710
Beachville	503
Blenheim	1,257
Bolton	727
Bothwell	695
Brampton	4,023
Brantford	26,601
Brantford Township	7,739
Breslau	500
Brigden	400
Burford	700
Burgessville	300
Caledonia	1,236
Chatham	13,943
Clinton	1,981
Comber	800
Dashwood	350
Delaware	350
Dorchester	400
Drayton	613
Dresden	1,403
Drumbo	400
Dublin	218
Dundas	4,834
Dunnville	3,286
Dutton	840
Elmira	2,065
Elora	1,005
Embro	472
Erin	502
Etobicoke Township	5,822
Exeter	1,504
Fergus	1,679
Forest	1,421
Galt	11,920
Georgetown	1,654
Goderich	4,553
Grantham Township	3,133
Granton	300
Guelph	16,022
Hagersville	1,053
Hamilton	104,491
Harriston	1,563
Hensall	717
Hespeler	2,887
Highgate	427
Ingersoll	5,300
Kitchener	19,380
Lambeth	350
Listowel	2,291
London	57,301
Lucan	643
Lynden	662
Milton	1,947
Milverton	929
Mimico	2,004
Mitchell	1,656
Mount Brydges	500
New Hamburg	1,398
New Toronto	1,423
Niagara Falls	11,715
Norwich	1,093
Oil Springs	537
Otterville	500
Palmerston	1,843
Paris	4,437
Petrolia	3,047
Plattsville	550
Point Edward	937
Port Credit	1,176
Port Dalhousie	1,318
Port Stanley	831
Preston	4,949
Princeton	600
Ridgetown	2,080
Rockwood	650
Rodney	626
Sandwich	3,077
Sarnia	12,323
Seaforth	2,075
Simcoe	4,032
Springfield	422
St Catharines	17,917
St. George	600
St. Jacobs	400
St. Mary's	3,960
St. Thomas	17,216
Stamford Township	3,418
Stratford	17,371
Strathroy	2,816
Streetsville	500
Tavistock	974
Thamesford	504
Thamesville	742
Thorndale	250
Tilbury	1,605
Tillsonburg	3,059
Toronto	460,526
Toronto Township	5,008
Vaughan Township	4,059
Walkerville	5,349
Wallaceburg	4,107
Waterdown	696
Waterford	1,027
Waterloo	5,091
Waterloo Township	6,538
Watford	1,115
Welland	7,905
West Lorne	708
Wellesley	583
Weston	2,283
Windsor	26,524
Woodbridge	615
Woodstock	10,004
Wyoming	526
Zurich	450
Total	1,011,978

SEVERN SYSTEM

60 Cycles

Alliston	1,237
Barrie	6,866
Beeton	588
Bradford	946
Coldwater	617
Collingwood	7,010
Cookstown	635
Creemore	599
Elmvale	775
Midland	7,109
Orillia	7,448
Penetang	3,672
Port McNichol	500
Stayner	990
Thornton	250
Tottenham	557
Victoria Harbor	1,542
Waubaushene	600
Total	41,941

WASDELL'S SYSTEM

60 Cycles

Beaverton	821
Brechin	215
Cannington	746
Sunderland	570
Woodville	357
Total	2,709

NIPISSING SYSTEM

60 Cycles

Callander	650
Nipissing	400
North Bay	9,651
Powassan	572
Total	11,273

MUSKOKA SYSTEM

60 Cycles

Gravenhurst	1,600
Huntsville	2,135
Total	3,735

EUGENIA SYSTEM

60 Cycles

	Pop.
Alton	700
Artemesia Township	2,396
Arthur	1,003
Chatsworth	286
Chesley	1,860
Dundalk	750
Durham	1,520
Elmwood	500
Flesherton	428
Grand Valley	586
Hanover	3,310
Holstein	285
Horning's Mills	350
Markdale	904
Mount Forest	1,871
Neustadt	470
Orangeville	2,381
Owen Sound	11,819
Shelburne	1,018
Tara	620
Total	33,057

OTTAWA SYSTEM

60 Cycles

Ottawa	100,561

PORT ARTHUR SYSTEM

60 Cycles

Port Arthur	15,224

CENTRAL ONTARIO SYSTEM

60 Cycles

Belleville	12,080
Bowmanville	3,545
Brighton	1,278
Cobourg	4,457
Colborne	811
Deseronto	2,061
Kingston	22,265
Lindsay	7,752
Madoc	1,114
Millbrook	746
Napanee	2,881
Newburgh	444
Newcastle	600
Omemee	446
Orono	700
Oshawa	8,812
Peterboro	19,816
Port Hope	4,486
Stirling	823
Trenton	5,169
Tweed	1,350
Whitby	2,902
Total	104,538

ST. LAWRENCE SYSTEM

60 Cycles

Brockville	9,473
Chesterville	868
Prescott	2,630
Williamsburg	100
Winchester	1,042
Total	14,113

RIDEAU SYSTEM

60 Cycles

Perth	3,358
Smith's Falls	6,115
Total	9,473

ESSEX COUNTY SYSTEM

60 Cycles

Amherstburg	1,990
Canard River	50
Cottam	100
Essex	1,429
Harrow	375
Kingsville	1,633
Leamington	3,604
Total	9,181

THE aim of the Bulletin is to provide municipalities with a source of information regarding the activities of the Commission; to provide a medium through which matters of common interest may be discussed, and to promote a spirit of co-operation between Hydro Municipalities.